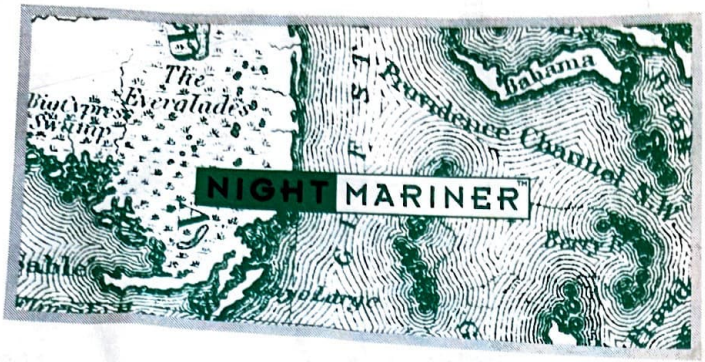
OWNER'S MANUAL



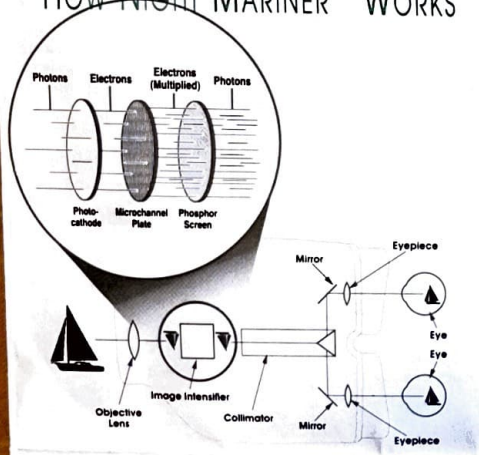
ITT

WARNING

To ensure safe operation of your craft, make sure you observe the following WARNINGS:

- ⚠ *The Night Mariner will <u>not</u> show a difference between red and green, port and starboard lights. It produces only a green viewing image. Verify the difference with your unaided eyes.*
- ⚠ *Do <u>not</u> operate your Night Mariner in a potentially explosive environment (for example, a bilge or the proximity of gasoline fumes or other volatile material). The Night Mariner is an electrical device.*
- ⚠ *Do <u>not</u> operate your boat in any unsafe manner that violates boating laws or customary safe practices (for example, operating without running lights) — even though the Night Mariner provides increased capabilities for nighttime operation.*
- ⚠ *Do <u>not</u> use your Night Mariner while under the influence of alcohol or medications that affect your judgment or perception. If you have any questions about medications, consult your physician.*
- ⚠ *Do <u>not</u> use your Night Mariner to operate a boat at high speed.*
- ⚠ *Do <u>not</u> use your Night Mariner to operate vehicles such as jet skis, all-terrain vehicles (ATVs), automobiles, aircraft, etc.*
- ⚠ *Do <u>not</u> continue to use your Night Mariner if for any reason it should fail to function properly. Contact ITT's Technical Support Center (see page 23).*
- ⚠ *Do <u>not</u> disassemble, puncture, recharge, or expose the battery to fire or high temperature — it can explode or cause burns. Keep batteries away from small children.*
- ⚠ *Do <u>not</u> carry batteries in pockets or bags containing coins, keys, etc. You can short circuit a battery and cause it to become very hot. Lithium batteries can explode when short circuited.*

How Night Mariner™ Works



PRINCIPLES OF OPERATION

Your Night Mariner is a high-quality electro-optical system that combines state-of-the-art technology and precision components in a rugged user-friendly viewer. The heart of the system is an image intensifier that receives very minute amounts of visible light and near-infrared waves from the moon, stars, and night sky and amplifies them thousands of times. The principle used is called photoemission which was first discovered by Heinrich Hertz in 1887 and theoretically explained by Albert Einstein in 1905. Photoemission is the release of electrons from a solid material as a result of energy put into the material by radiation and light.

RANGE PERFORMANCE

The following chart compares the Night Mariner's performance to that of your unaided eye under varying nighttime conditions as well as to normal vision during daytime hours.

How far can you see?*

	Day	Full Moon	50% Moon	20% Moon	Starlight	Overcast Starlight
Eyesight • Buoy (3' h) • Boat (30' l)	1700 yd (1550) 17000 yd (15500)	250 yd (225) 2500 yd (2250)	75 yd (70) 750 yd (700)	25 yd (23) 250 yd (230)	Not Measurable	Not Measurable
Night Mariner • Buoy (3' h) • Boat (30' l)		900 yd (825) 9000 yd (8250)	650 yd (600) 6500 yd (6000)	325 yd (300) 3250 yd (3000)	225 yd (200) 2250 yd (2000)	75 yd (70) 750 yd (700)

*Distances in parentheses are in meters.

Table of Contents

Foreword ii

SECTION 1: HOW NIGHT MARINER WORKS 1
Principles of Operation 1
Range Performance 3
Characteristics and Limitations of Night Vision 4

SECTION 2: CONTROLS AND FEATURES 7
Controls and Adjustments 7
Features 10

SECTION 3: OPERATION 12
Battery Installation 12
Adjusting the Hand Strap 13
Holding the Night Mariner 13
Turning the Night Mariner On and Off 14
Adjusting the Eye-Span 14
Focusing the Eyepieces 15
Focusing for Distance 15
Brightness Control 16
Low-Battery Indicator 17
High-Light Indicator 17
Using the Night Mariner 18

SECTION 4: ACCESSORIES 19

SECTION 5: CARE AND MAINTENANCE 20
Caring for Your Night Mariner 20
Troubleshooting 21
Returning Your Night Mariner for Repair 23
Replacement Parts 24

SPECIFICATIONS 25
INDEX 26

Foreword

ITT Night Vision is pleased to introduce you to the Night Mariner night vision viewer which is specifically designed for marine use. For over 30 years, ITT has earned the reputation as one of the world's leading producers of high-quality night vision equipment for the military. Now, we are able to extend this exciting technology to you.

Your Night Mariner is the culmination of many months of research and engineering design — all coordinated to enhance your nighttime boating and fishing. The excitement and enthusiasm generated over the development of the Night Mariner is equalled only by the quality of its construction and performance, which we are confident you will find far superior to any night vision product you may have used previously.

By affording you the ability to see at night, we hope the Night Mariner brings you many hours of extended operation and enjoyment — whether you are boating at night or fishing in the early hours before dawn. Please take the time to completely familiarize yourself with this Owner's Manual, which describes the proper use of the Night Mariner.

How Night Mariner™ Works

In your Night Mariner, the objective lens collects light that you cannot see with your naked eye and focuses it on the image intensifier. Inside the image intensifier a photocathode absorbs this light energy and converts it into electrons. These electrons are then drawn toward a phosphor screen but first pass through a microchannel plate that multiplies them thousands of times. When this highly intensified electron image strikes the phosphor screen, it causes the screen to emit light that you can see. Since the phosphor screen emits this light in exactly the same pattern and degrees of intensity as the light that is collected by the objective lens, the bright nighttime image you see in the eyepieces corresponds precisely to the outside scene you are viewing.

NOTE: Do not use the Night Mariner as your primary navigational instrument. It is designed to supplement the use of existing equipment.

By bringing night vision technology to maritime operations, ITT's Night Mariner provides you with a valuable navigation aid that will improve your ability to use nighttime hours. However, because night vision is not the same as daytime vision, you should be aware of the differences in order to maximize Night Mariner's usefulness. Be sure you and all other users of your Night Mariner read this manual and become familiar with the characteristics, features, and limitations of night vision.

CHARACTERISTICS AND LIMITATIONS OF NIGHT VISION

Monochromatic Image — Because the Night Mariner produces a monochromatic image, there is no differentiation of colors. In particular, red and green, port and starboard lights will both appear green. Take care to verify the difference with unaided vision.

Color Sensitivity — The Night Mariner is more responsive to red and white lights than green and blue lights. Because of this, distant red and white lights may appear closer than green or blue lights. Be careful when using these lights for navigation. Periodically verify the distances to these lights with your unaided eyes.

Extreme Darkness — Your Night Mariner is effective under most nighttime conditions, including overcast starlight, but it is not effective in extremely dark conditions such as a cave or areas without any light. Under extremely dark conditions, you will notice pinpoint-size sparkles in the image area. These sparkles are small amounts of energy generated inside the image intensifier that strike the phosphor screen and are an indication that the device is working. You will be surprised that there are very few nighttime conditions when your Night Mariner cannot be used. Because it is very sensitive to starlight, the phases and position of the moon, and nearby lights reflected off clouds, familiarize yourself with your Night Mariner under all of these conditions.

WARNING: The Night Mariner will not show a difference between red and green, port and starboard lights. The Night Mariner produces only a green image.

<u>CAUTION</u>: Red and white lights may appear to be closer than green or blue lights. Be careful when using artificial lights for navigation while using the Night Mariner.

How Night Mariner™ Works

CAUTION: The Night Mariner is sensitive to light not detected by the human eye and to differences in light reflected from various types of surfaces. Resulting contrast reversals may obscure objects on the horizon.

CAUTION: The Night Mariner does not present normal depth perception; objects may be closer than they appear.

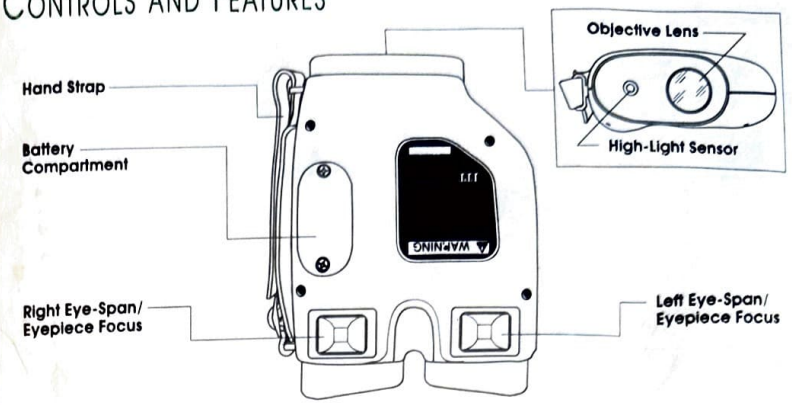
Contrast Reversal — Your Night Mariner detects light that cannot be seen by the human eye. This light is often referred to as near-infrared light. Because the Night Mariner detects this light, the contrast of the image you see will appear different than it would under normal conditions. Objects that normally appear lighter than their surroundings may appear dark against a lighter background.

In addition, the image you see in the Night Mariner is also dependent on the reflective quality of the objects you see in the viewing area. Objects that appear light during the day but have a dull surface may appear darker through the Night Mariner than objects that are dark during the day but have a highly reflective surface. For example, a shiny dark-colored buoy may appear brighter than a light-colored buoy with a dull surface.

For these reasons, be careful when using the Night Mariner for navigation. Experience and familiarity with the device is necessary.

Depth Perception — Night vision does not present normal depth perception. Use extreme caution when rigging a boat, navigating, or walking with the Night Mariner.

Controls and Features



Fog and Rain — The Night Mariner is very responsive to reflected ambient light; therefore, the effect of fog or heavy rain is to reflect much more light toward the Night Mariner and may seriously degrade its performance. Fog or heavy rain can create a "white-out" effect.

Honeycomb — This is a faint hexagonal pattern throughout the image area and is more noticeable under high-light conditions. Do not be concerned if you see this feature — it is an inherent characteristic of all high-amplification night vision systems that incorporate a microchannel plate in the image intensifier (see page 2).

CAUTION: The Night Mariner is not intended as a navigational aid in fog or heavy rain.

Image Intensifier Life — The Night Mariner was designed to be durable and rugged; however, the image intensifier used to amplify light does not have an unlimited lifetime. The life of the image intensifier is dependent upon the amount of use. Under normal operating conditions, it will provide reliable performance for many years. If there is doubt about your Night Mariner's performance, contact your dealer or ITT for technical assistance (see page 23).

FEATURES

Automatic Shutoff — The Night Mariner will automatically shut off after approximately 5 minutes if you do not use any of the buttons. This feature preserves battery life. If you want to turn the system back on, simply press the POWER button again.

High-Light Indicator and Shutoff — A special sensor detects when light levels are too high (dusk, dawn, or brighter) and indicates this with a blinking red light in the left eyepiece. If the high-light condition remains, the system will automatically shut off about 7 seconds after the blinking starts. To turn the system back on again, press the POWER button.

CAUTION: Do not obstruct the high-light sensor or you may damage the image intensifier.

Low-Battery Indicator — A steady red warning light in the left eyepiece notifies you that battery voltage is low. There is about 1/2 hour left on the battery when this light first appears.

Automatic Brightness Control — This feature provides a constant brightness of the image under varying light levels. The output never gets so bright it will hurt your eyes. Under high-light conditions, a circuit overrides the manual control to protect the image intensifier. Under low-light conditions, you can override this feature by using the "+" BRIGHTNESS control button.

CONTROLS AND ADJUSTMENTS

Refer to the illustrations on pages 8 and 9 to identify the controls and adjustments.

Power Button — Turns on and shuts off power to the Night Mariner.

Objective Focus — Adjusts the objective (front) lens to achieve the sharpest image for varying distances. Pressing on the right side of the button focuses for distances out to infinity. Pressing on the left side focuses for closer distances to about 1 foot.

Eyepiece Focus — Adjusts the eyepiece lenses to accommodate for differences in eyesight. The Night Mariner is designed to eliminate the need for most users to wear eyeglasses in order to see a clear image in the eyepieces.

Eye-Span Adjustment — Independently moves each eyepiece laterally to accommodate for differences in eye span.

Brightness Controls — Adjusts the brightness of the viewed image. Pressing the "+" button increases the image brightness while pressing the "–" button decreases the image brightness.

Battery Compartment Access — Provides for installing and replacing the battery. The screws securing the compartment cover can be loosened with the No. 2 Phillips screwdriver included with your Night Mariner.

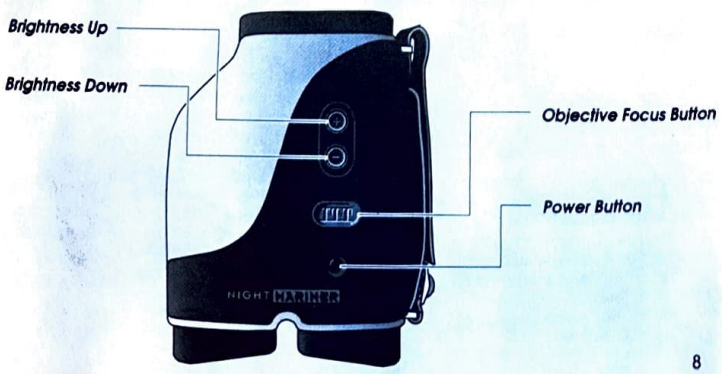
NOTE: The sharpest image is seen when the objective and eyepiece lenses are properly focused. These adjustments are independent and must be made separately.

CAUTION: The Night Mariner is neither designed nor intended for underwater use. Do not intentionally submerge it.

Water Resistant — Your Night Mariner is water resistant up to and including driving rain. If it is accidentally dropped into water, it will float so you can retrieve it.

Lens Covers — To protect the optics, your Night Mariner includes covers for the eyepieces and objective lens. Remove the covers before using the Night Mariner. Due to a pinhole in the objective lens cover, this cover can also be used to operate the Night Mariner under daylight conditions to focus the eyepieces or familiarize yourself with the system's operation. However, when the objective lens cover is used for daylight operation, the focus mechanism will not appear to work. The cover operates much like a "pinhole" camera.

Controls and Features



Operation

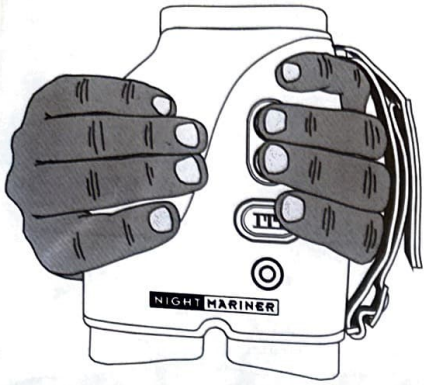
BATTERY INSTALLATION

With your thumb or finger, press down on the middle of the battery compartment cover and at the same time use the No. 2 Phillips screwdriver to loosen the two screws that secure the cover. Release your thumb or finger and remove the cover and battery.

When installing a battery, make sure the exposed contacts of the battery are facing the spring contacts in the bottom of the battery compartment.

The battery compartment cover is not symmetrical. Orient it so it matches the contours of the Night Mariner and hold it in place with your thumb or finger as you did when removing the screws. While pressing down on the cover, retighten the screws using the No. 2 Phillips screwdriver. Do not overtighten the screws.

WARNING: Do not disassemble, puncture, short circuit, recharge, or expose the battery to fire or high temperature — it can explode or cause burns. Do not carry batteries in pockets or bags containing coins or keys; you can short circuit the battery.



ADJUSTING THE HAND STRAP

Pull back the hook-and-pile fastener so the strap is loose and you can easily slide your hand under it. After positioning your hand to manipulate the buttons, tighten the strap and press the hook-and-pile fastener into place. This hand strap helps you operate the Night Mariner with only one hand.

HOLDING THE NIGHT MARINER

Place your right hand under the hand strap and position your fingers over the buttons. Most users prefer to put their index finger over the OBJECTIVE FOCUS button and their middle fingers on the BRIGHTNESS control buttons; the index finger controls both the POWER and OBJECTIVE FOCUS buttons.

Initially, grasp the Night Mariner with both hands and position your thumbs on the EYE-SPAN/EYEPIECE FOCUS controls located on the underside of the system. After the eyepieces are adjusted, you will not need to continuously manipulate the eyepiece controls so the Night Mariner can be easily held with one hand.

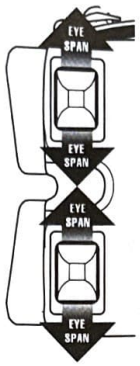
Because the eyepieces will focus for differences in eyesight, you may want to remove your eyeglasses if you wear them.

TURNING THE NIGHT MARINER ON AND OFF

To turn on your Night Mariner, press the POWER button and look for a green glow in the eyepieces (there may be a brief delay of a second or so). To turn off the system, press the POWER button again and notice that the green glow goes out.

ADJUSTING THE EYE-SPAN

With the Night Mariner turned on, hold it up to your eyes. Slide the left and right eye-span controls laterally to adjust for the proper distance between your eyes. When the eye-span is set correctly, you should have a single unobscured image. If you wear eyeglasses and cannot see the entire image, remove your eyeglasses. As explained in the next paragraph, the Night Mariner will accommodate for your eyesight.



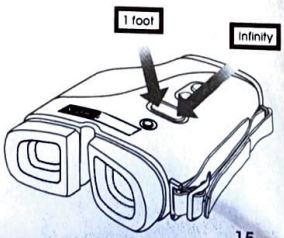
FOCUSING THE EYEPIECES

To focus the eyepieces, first press on the right side of the OBJECTIVE FOCUS button until the motor stops so the Night Mariner is set for infinity focus. Then, while looking at a distant object, slide the EYEPIECE FOCUS controls forward or back until you get the sharpest image. You may want to close one eye at a time and focus for the open eye.

Once the eyepieces are focused, you do not need to refocus them for differences in distance. The objective lens will adjust for differences in distance allowing convenient one-hand operation.

FOCUSING FOR DISTANCE

Pressing on the right side of the OBJECTIVE FOCUS button will activate the focus mechanism and move the objective lens to focus on objects further away out to infinity. Pressing on the left side of the OBJECTIVE FOCUS button will bring objects that are closer toward you into focus — up to about 1 foot. For use beyond 30 feet, leaving the objective lens set for infinity will still provide you with a sharp image.



BRIGHTNESS CONTROL

By pressing the "+" BRIGHTNESS control button, you can increase the brightness of the image up to its maximum level. However, under high-light conditions such as daylight or roomlight, the automatic brightness control feature will override the manual control to protect the image intensifier.

NOTE: The sharpest image will be seen only when the objective lens and both eyepieces are properly focused. The objective adjustment focuses on objects at varying distances and the eyepiece focus controls focus to your individual eyesight (without eyeglasses). These adjustments operate independently and must be made separately.

By pressing the "–" BRIGHTNESS control button you can decrease the brightness of the image.

Adjust the image brightness for the best image quality. Often this feature is helpful if there are bright points of light in the image area that tend to obscure other portions of the field of view. Reducing the brightness may improve the quality of the overall image.

LOW-BATTERY INDICATOR

When the battery voltage drops to 4 volts, a steady red warning light in the left eyepiece will notify you to change the battery.

The amount of time left on the battery will vary depending on the temperature and how much you use the objective focus. At colder temperatures and more frequent use of the objective focus, battery life decreases. For example, at temperatures of freezing or below, battery life decreases about 25 percent. When the low-battery indicator comes on, you will still have at least 1/2 hour left, so change the battery as soon as possible.

WARNING: When the low-battery indicator light comes on, change the battery as soon as possible to preclude the Night Mariner from shutting down when the battery gets too low.

HIGH-LIGHT INDICATOR

A blinking red light in the left eyepiece will let you know that the Night Mariner is operating under light that is too bright. If you continue to operate your Night Mariner under these conditions, or you should accidentally leave it on under these conditions, a safety feature in the electronic circuit will sense this bright light and shut off the system after about 7 seconds. If you want to turn the system back on again, simply press the POWER button; if the light conditions are still too high, it will shut off again in about 7 seconds.

USING THE NIGHT MARINER

Scanning — The Night Mariner provides a 40° field of view which is substantially less than the normal peripheral vision of 190°. Therefore, you will need to use a scanning technique to maintain awareness of your surroundings. Becoming accustomed to this technique requires practice.

Bright Lights — Very bright lights in the field of view may engage the bright-source protection circuit and cause the image brightness to decrease. If possible, briefly look away from the bright source to return your Night Mariner to normal operation.

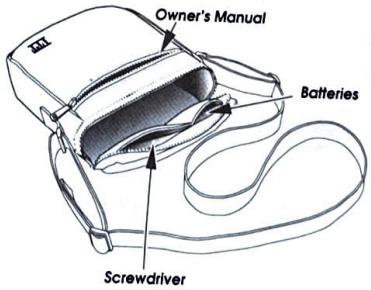
Also, a bright point of light in the image area may cause a slight halo to appear around the object that can obscure nearby features and the horizon. You can diminish this effect by pressing the "–" BRIGHTNESS control button for a lower setting.

Dark Adaptation — When you use the Night Mariner, your eyes will adjust to the light output of the eyepieces. Therefore, after using the Night Mariner, allow a sufficient period of time for your eyes to readjust to the dark.

NOTE: In order to use your Night Mariner most effectively and understand the unique characteristics of night vision technology, make sure you and all users of your Night Mariner have read this manual. Pay particular attention to the sections entitled "Operation" and "Characteristics and Limitations of Night Vision."

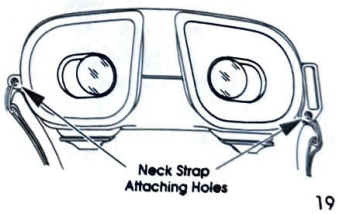
ACCESSORIES

Carrying Case — Designed to store and protect your Night Mariner and neck strap. In addition, it provides a convenient place to keep your Owner's Manual, spare batteries, and screwdriver. The strap is adjustable to varying lengths.



Lens Covers — Eyepiece and objective lens covers slip over the rubber eyecups and nose piece to protect the optical elements from damage.

Neck Strap — Attaches to the Night Mariner to provide additional security and to make the Night Mariner more convenient to use. Like the Night Mariner, the neck strap also floats.



CARING FOR YOUR NIGHT MARINER

Carrying Case — Whenever you are finished using the Night Mariner, store it in the carrying case. Keep the carrying case free of sand or dirt to prevent damage to the Night Mariner's optics. If necessary, the carrying case may be washed with warm water and mild detergent. Do not store your Night Mariner in a wet carrying case; allow the carrying case to dry as soon as possible.

Optics — If the optics get wet, dry them with lens tissue or an absorbent lint-free cloth. If the optics are dirty or salt water has crystallized on them, clean the optics with fresh water and then dry them (do not use chemical cleaners). Avoid touching the optics with your fingers and be careful not to rub grit or salt crystals around on the optics or you may scratch them. Keep the lens covers on the optics whenever you are not using your Night Mariner.

Battery/Battery Compartment — Remove the battery from the unit if you will not be using it for a couple of weeks or more. Make sure the battery compartment is clean and free of moisture or corrosion.

Check the gasket to make sure it is not torn, deteriorated, or excessively worn. If it needs to be replaced, use your fingers or a blunt instrument to remove the old gasket. Peel the backing from a new gasket and carefully press it into place. Make sure to align the holes properly. (See page 24 to obtain a new gasket.)

Moisture — The Night Mariner is water resistant, floats, and designed to withstand exposure to water that is characteristic of marine environments. However, do not intentionally submerge the system or put it away wet. Dry if off with a clean, grit-free cloth and return it to the carrying case.

CARE AND MAINTENANCE

Salt Water — If your Night Mariner is exposed to salt water, wipe it off with a clean cloth dampened with fresh water and dry it. Take special care of the optics as noted on page 20. If the carrying case should get wet with salt water, remove any items from the inside and rinse the case with fresh water. Allow it to dry before storing anything in it again.

Sunlight — Do not leave your Night Mariner in direct sunlight such as the dash or seat of a boat or car.

Rubber Components — The eyecups, nose piece, and seals around the eye-span/eyepiece focus controls are made of hypo-allergenic silicone rubber. Clean these parts with a soft cloth dampened with fresh water. If the seals around the eye-span/eyepiece focus controls are torn, the Night Mariner is no longer fully water resistant. Contact you dealer or ITT's Technical Support Center for assistance (see page 23).

TROUBLESHOOTING

If your Night Mariner should fail to operate properly, perform the following checks before contacting your dealer or ITT for assistance. *Do not attempt to open the Night Mariner's housing — it is sealed during manufacture and cannot be opened without damage.*

Unit will not come on

- POWER button is not properly depressed — Push the POWER button firmly and completely and briefly hold it in the depressed position. When the button is properly depressed, you should be able to feel the switch engage as well as hear a faint audible click. If the switch is working and the unit still does not come on, check the batteries as described below.
- Battery installed upside down — Remove the battery and reinstall it correctly.

- Battery contacts are inoperative or the battery is discharged — Open the battery compartment and inspect the contacts. If the contacts are corroded, thoroughly clean them with a cotton swab moistened with a mild solution of baking soda and water. Using clean water, clean off any residue of baking soda and allow the battery compartment to dry before reinstalling a battery. If the battery contacts are clean and the unit still does not come on, replace the battery with a fresh one.

Image does not appear to be focused

- Light conditions are too high — The Night Mariner is intended for operation under dark conditions. Higher light levels, similar to dawn or dusk, will degrade the resolution and the image will appear to be slightly out of focus.
- Eyepieces or objective lens are not properly focused — Make sure all the optics are clean; then, with the unit turned on, press the OBJECTIVE FOCUS button for infinity focus. Look at a distant object, such as a star, and adjust the EYEPIECE FOCUS knobs for the sharpest picture. The image should now be in focus.

Unit operates erratically

- The battery is weak — Replace the battery with a fresh one.

Moisture in the battery compartment

- The battery compartment gasket is defective — Replace the gasket as described on page 20.

If your Night Mariner will not function properly after following the troubleshooting procedures, contact your dealer or ITT's Technical Support Center.

RETURNING YOUR NIGHT MARINER FOR REPAIR

1. Locate the serial number of your Night Mariner and write it down. The serial number is on the label on the underside of the Night Mariner. The serial number will help us to quickly determine if any needed repairs are under warranty.

2. Call your dealer or ITT's Technical Support Center at:

1-800-448-8678

The Technical Support Center will try to evaluate the defect over the telephone. If the problem cannot be resolved, you will be given a Return Material Authorization (RMA) number and asked to ship your Night Mariner to our facility. **Please do not return any equipment to us without first obtaining an RMA number.** If your unit is not under warranty, you may request an estimated cost for repairs, which will be furnished to you by telephone shortly after we receive your Night Mariner.

3. If you return your Night Mariner to ITT for repair, please return the unit and accessories as complete as possible.

4. Complete the RMA tag contained in your original Return Documentation Package. If you do not have an RMA tag, use a standard luggage tag and record the following information on it:

Name
Address
Telephone number
RMA number
Brief description of the problem

5. Attach the RMA or luggage tag to the Night Mariner.

6. Pack the Night Mariner securely and make sure it is well padded. If you kept the original carton, it is ideal for packing and returning the unit.

7. Include the RMA number on the shipping label and send the unit, insurance and postage prepaid, to:

Technical Support Center (RMA #_____)
ITT Night Vision
7635 Plantation Road
Roanoke, VA 24019

8. If your unit is out of warranty and you request an estimated cost of repairs, we will telephone you with this information and obtain your approval before we proceed. After repairs are made, your Night Mariner will be returned freight and insurance prepaid.

REPLACEMENT PARTS

Your may obtain the following replacement parts from ITT's Technical Support Center.

Hand Strap — 265262
Neck Strap — 265263
Carrying Case — 265264
Battery Compartment Cover — 265228
Battery Compartment Screws — 265227-8
Battery Compartment Gasket — 265229
Lens covers, set — 265591
No. 2 Phillips Screwdriver — 265661

SYSTEM

Image Intensifier Type	Proximity-focused, 18-mm, Generation II
System Resolution	0.76 cy/mr
Image Intensifier Gain	20,000 minimum

OPTICAL

Magnification	1X
Field of View	40°
Objective Lens	F/1.2
Focus Range	1 foot (30.5 cm) to infinity
Diopter Range	+2 to –6
Eye Span	2.25 inches to 3.0 inches (57 mm to 76 mm)

MECHANICAL

Weight (with battery)	26 oz. (740 gm)
Length	7 1/4 inches (18.4 cm)
Height	2 1/2 inches (6.3 cm)
Width	5 1/2 inches (14.0 cm)

ELECTRICAL

Voltage Requirement	4 to 6 volts
Battery	Single 6-volt lithium: Duracell DL223A, Kodak K223LA, Panasonic CR-P2, Eveready EL223AP, or equivalent
Battery Life	Approx. 13 hours at room temperature (The amount of focusing and temperature will affect battery life.)

Specifications are subject to change without notice

	PAGE
Accessories	19
Automatic brightness control	10,16
Automatic shutoff	10
Battery	7,12,17,19,20,21,25
compartment	7,9,12,20,22,24
contacts	12,22
installation	12
life	10,17,25
Brightness	7,8,10,16,18
Carrying case	19,20,24
Color sensitivity	4
Contrast reversal	5
Controls	7-11
Depth perception	5
Eye-span	7,9,14,25
Eyecups	21
Eyepiece focus	7,9,14,15
lens	2,7,15,16,17,22
Field of view	16,19,25
Focus	7,8,15,25
Fog	6
Gasket	20,24
Hand strap	9,13,24
High-light condition	6,10,16,22
indicator	10,17
sensor	9,10
Honeycomb	6
Image intensifier	4,6,10,25
Infrared	1,5
Lens covers	19,20,24
Lights, bright	16-18
port & starboard	4
red & white	4
Low-battery indicator	10,17
Low-light condition	10
Maintenance	20-24
Microchannel plate	1,2,6
Moisture	20,22
Monochromatic	4

	PAGE
Moon	1,3,4
Navigation	2,5,6
Neck strap	19,24
Nose piece	21
Objective focus	7,8,13,15,16,17,21
lens	7,9,16,22,25
Operation	1,12-18
Optics	20,21,24
Peripheral vision	18
Phosphor screen	2,4
Photocathode	2
Photoemission	1
Power button	7,8,10,13,14,17,21
Rain	6
Range	3,15
Reflectivity	5
Repair	23
Replacement parts	24
Salt water	20,21
Scanning	17
Screwdriver	7,12,19,24
Seals	21
Specifications	25
Starlight	1,3,4
Sunlight	21
Technical Support Center	23,24
Troubleshooting	21,22
Voltage	10,17,25
Warnings	Inside cover
Water resistant	10,20

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1/94